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**Document Number 7**

Entry 7 of 83

File: USPT

Jul 7, 1998

DOCUMENT-IDENTIFIER: US 5776606 A

TITLE: Insulating and anticorrosive composition for electrical devices

**BSPR:**

The expression "resin oil" is used to mean a liquid comprising a mixture of rosin acids and esters. It can also contain the respective oxidation products and natural triglycerides. Preferably it has an acid number of from 60 to 90 mg KOH/g, a density of from 0.95 to 1.1 g/cm.<sup>sup.3</sup> and a viscosity of from 1 to 5 Pa.s at 25.degree. C.

**CCXR:**174/209

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Entry 10 of 83

File: USPT

Sep 30, 1997

DOCUMENT-IDENTIFIER: US 5672640 A

TITLE: Polypropylene compatible grease compositions for optical fiber cable

**BSPR:**

Grease compositions have been used as cable filling material is both conventional (electrical) communications as well as for optical fiber cables. U.S. Pat. No. 4,701,016 discloses a grease compositions comprising an oil, a gelling agent such as colloidal particles of silica or clay, and optionally a bleed inhibitor. The oils which are disclosed as being useful in the compositions of the patent include certain naphthenic or paraffinic oils having certain specific gravities and properties, polybutene oils of similar specific properties, triglyceride based vegetable oils, polypropylene oil, chlorinated paraffin oils, and polymerized esters. The colloidal particle filler material preferably comprises silica particles such as fumed silica or precipitated silica. Preferred bleed inhibitors include styrene-rubber, styrene-rubber-styrene, or other block polymers, and/or semi liquid rubbers such as high viscosity polyisobutylene. Other ingredients such as thermal oxidative stabilizers may optionally be present.

**BSPR:**

The polyols which are useful in this invention include castor oil or other hydroxy-terminated polymers derived from castor oil, ricinoleate diols or other ricinoleate polyols. Castor oil is a naturally occurring triglyceride of ricinoleic acid. Castor oil is actually a mixture of mono-, di-, and triglycerides and has an average hydroxyl functionality of approximately 2.7. Other ricinoleate polyols include ricinoleate diols and glycol, polyglycol and other polyhydric alcohol mono-, di-, and polyesters of ricinoleic acid. The ricinoleate polyols of U.S. Pat. No. 4,812,533 are useful, and the content of that patent is expressly incorporated herein by reference thereto. Castor oil is the most preferred due to its relatively low cost and ready availability.

**CCXR:**174/110R[Main Menu](#) [Search Form](#) [Result Set](#) [Show S Numbers](#) [Edit S Numbers](#) [Referring Patents](#)[First Hit](#)[Previous Document](#)[Next Document](#)[Full](#) [Title](#) [Citation](#) [Front](#) [Review](#) [Classification](#) [Date](#) [Reference](#) [Claims](#) [KWIC](#)[Help](#)[Logout](#)

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| <a href="#">Date</a>      | <a href="#">Reference</a>   | <a href="#">Claims</a>            | <a href="#">K00C</a>           |                                |                                   |

**Document Number 41**

Entry 41 of 83

File: USPT

Mar 29, 1988

DOCUMENT-IDENTIFIER: US 4734824 A

TITLE: Electrical insulating oil and electrical appliances impregnated with the same

## DEPR:

Such known electrical insulating oils are exemplified by mineral oils; olefin oligomers such as polybutene; alkylbenzenes such as dodecylbenzene; diarylalkanes such as 1-phenyl-1-xylylethane, 1-phenyl-2-(isopropylphenyl)ethane and benzyltoluene; diaralkyl aromatic hydrocarbons such as dibenzyltoluene; alkylbiphenyls such as monoisopropylbiphenyl; terphenyls and their partially nuclear-hydrogenated products; alkylnaphthalenes such as diisopropylnaphthalene; diaryl ethers such as ditolyl ether; diaralkyl ethers such as bis(.alpha.-methylbenzyl)ether; esters typically exemplified by phthalic esters such as dioctyl phthalate; animal and vegetable oils of triglycerides such as castor oil and cotton seed oil.

## CCXR:

[174/17LF](#)

## CCXR:

[174/25C](#)

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| <a href="#">Date</a>      | <a href="#">Reference</a>   | <a href="#">Claims</a>            | <a href="#">K00C</a>           |                                |                                   |

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**Document Number 75**

Entry 75 of 83

File: USPT

Nov 29, 1977

DOCUMENT-IDENTIFIER: US 4060583 A  
TITLE: Electrically insulating composition

**DEPR:**

A wide variety of commercial liquids or oils are useful as the base organic liquid and may be blended with one another; quite often a base organic liquid used in a composition of the invention is a mixture of different compounds. Some useful organic liquids include: petroleum fractions, which are products obtained by separation and purification of crude oil and are represented by oils such as mineral oil, transformer oil, or cable-impregnating oil; synthesized oils such as alkyl benzenes; plasticizers common to the art of compounding thermoplastics, such as dioctyl phthalates or diisononyl phthalate; oils obtained from plant sources, such as pine oils or vegetable oils; and silicone oils.

**CCXR:**174/17LF**CCXR:**174/19

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| Full      | Title       | Citation          | Front          | Review         | Classification    | Date | Reference | Claims | KWIC |

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**Document Number 81**

Entry 81 of 83

File: USPT

Nov 14, 1972

DOCUMENT-IDENTIFIER: US 3702895 A  
TITLE: CABLE TERMINATOR WITH DIELECTRIC

**DEPR:**

The cable 58 is thereby retained in proper insertion within the terminator 1. The ceramic insulator 1 may be at least partially filled with a dielectric medium 106. Any suitable solid dielectric or high viscosity dielectric substance may be utilized. However, in a preferred embodiment of the invention, a suitable flowable dielectric proves to be most advantageous. Particularly, suitable dielectric mediums were found to be, a vegetable oil such as castor oil, or a mineral oil or other organic liquids. Leakage of the oil is prevented by the seal 28, the grommet 96 and the sealant 82 which covers the cable end portion 68. To complete the assembly, a covering and sealing structure for the end of the ceramic insulator housing 2 is indicated at 107 is the form of a sealing cap. The cap has a generally central aperture 108 which receives therethrough the threaded end portion 73 of the electrical connector 72. A sealing washer 110 encircles the threaded end portion 73 and is compressed into sealing engagement on the cap 107 by a lock washer 112 and a threaded nut 114 that is threadably driven over the end portion 73. Another moisture seal in the form of an enlarged diameter washer 116 is compressed between the ceramic insulator housing 2 and the cap 107. The housing is thereby sealed from moisture.

**CCOR:**174/19**CCXR:**174/73.1

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## Document Number 1

Entry 1 of 5

File: USPT

Apr 7, 1998

DOCUMENT-IDENTIFIER: US 5736915 A

TITLE: Hermetically sealed, non-venting electrical apparatus with dielectric fluid having defined chemical composition

### BSPR:

This invention relates generally to equipment utilized in the transmission and distribution of electrical power. More specifically, the invention relates to transformers and other apparatus containing dielectric fluids, particularly dielectric fluids comprising relatively pure blends of compounds selected from the group consisting of aromatic hydrocarbons, polyalphaolefins, polyol esters, and natural vegetable oils. The invention further relates to the methods for preparing and processing such fluids and filling and sealing electrical apparatus with such fluids.

### BSPR:

The dielectric fluid of the present invention comprises a mixture of hydrocarbons having a well-defined chemical composition. The physical properties of the blend can be tailored to meet the requirements of use in various electrical power distribution equipment, and in transformers in particular. The dielectric coolants of the present invention are particularly suited for use in sealed, non-vented transformers, and have improved performance characteristics as well as enhanced safety and environmental acceptability. The present dielectric coolants comprise relatively pure blends of compounds selected from the group consisting of aromatic hydrocarbons, polyalphaolefins, polyol esters, and natural vegetable oils.

### DEPR:

A dielectric fluid must possess a number of important characteristics. It must transfer heat effectively, have an appropriate dielectric strength, and should not possess ingredients harmful to the environment. It has been found that certain mixtures of particular classes of compounds satisfy both the requirements for suitability as dielectric coolant and the requirements relating to environmental compatibility. Those mixtures consist of two or more compounds selected from the following classes: aromatic hydrocarbons, polyalphaolefins, polyol esters and triglycerides derived from vegetable oils, as described below.

### DEPR:

Polyol esters result from the chemical combination of polyalcohol compounds with organic acids containing a variety of alkyl groups. The chain length of the alkyl group on the polyol ester will be between C.sub.5 and C.sub.20. The substitution in the polyol ester may be the same, i.e. all the same alkyl group, or the molecule may contain different alkyl chains. Branched alkyl chains are preferred. The preferred polyols are neopentyl glycol (1), trimethylolpropane (2), and pentaerythritol (3). ##STR15## To form the preferred esters, these are combined with monoacids having the following general formula: ##STR16## where R is a branched or unbranched alkyl group with carbon chain lengths of C.sub.5 to C.sub.10, C.sub.12, C.sub.14 or C.sub.16 or

mixtures thereof. The preferred polyols form polyol esters having the following formulas, respectively: ##STR17## where each of R.sub.1-4 are the same or different and are selected from the C.sub.5 to C.sub.10, C.sub.12, C.sub.14 and C.sub.16 alkyl groups described above. A particularly preferred polyol ester has the following formula: ##STR18## wherein each alkyl carbon chain can be branched or unbranched. IV.

Vegetable Oils

## DEPR:

Vegetables oils are natural products derived from plants, and most commonly from plant seeds. The oils are a source of a general class of compounds known as triglycerides, which derive from the chemical combination of glycerin with naturally occurring mono carboxylic acids, commonly referred to as fatty acids. Fatty acids are classified by the number of carbons contained in the alkyl chain and by the number of carbon double bonds incorporated into the carbon chain of the fatty acid.

## DEPR:

The combination of three saturated, mono- or poly-unsaturated fatty acids having carbon chain lengths of from four carbons to twenty-two carbons with glycerin forms a triglyceride molecule with the general formula: ##STR19## where R.sub.1, R.sub.2 and R.sub.3 may be the same or different with carbon chains from C.sub.4 to C.sub.22 and levels of unsaturation from 0 to 3.

## DEPR:

Vegetable oil triglycerides are defined by the typical percentages of the various fatty acids they contain. These percentages may vary with plant species and growing conditions. The vegetable oils useful in this invention include: soya, corn, sunflower, safflower, cotton seed, peanut, rape, crambe, jojoba, and lesquella seed oils.

## DEPR:

A particular preferred composition may be derived from a blend of one or more vegetable oil sources.

## DEPR:

As stated above, the dielectric fluids contemplated in the present invention consist of combinations of two or more of the classes of molecules previously described, including aromatic hydrocarbons, polyalphaolefins, polyolesters, and vegetable oils. For example, a preferred composition comprises about 75 to about 85 weight percent polyalphaolefin combined with about 25 to about 15 weight percent of an aromatic molecule whose predominant composition is phenyl ortho xylyl ethane. Preferred polyalphaolefins include oligomers, and in particular a dimer, of 1-decene that have been hydrogenated to saturation. The preferred composition may also contain hindered phenolic antioxidants such as 2,6-di-tert-butylphenol, sold under the trade name Ethanox 701 by Albemarle, Inc. of Baton Rouge, La. Another additive that can be added to improve electrical stability is a diepoxide of which ERL 4299, manufactured by Union Carbide Corp. is a preferred example.

## DEPR:

Similarly, a polyalphaolefin may be blended with polyol esters and/or triglycerides as previously mentioned. The composition may range from about 1 to about 99 weight percent polyalphaolefin and from about 1 to about 99 weight percent polyol ester and/or triglyceride, with a more preferred range being about 50.+-.10 weight percent polyalphaolefin with about 50.+-.10 weight percent weight percent polyol ester and/or triglyceride. Additives may be added to improve stability and prevent oxidation as discussed above. A preferred additive for use with polyol esters is 2,6-ditertiary butyl paracresol (DBPC) at a level of 0.3 weight percent, and a preferred additive for use with vegetable oils is TBHQ at a level of 0.4 weight percent,

## DEPR:

Blends of 80 weight percent soya oil triglycerides with 20 weight percent phenyl ortho xylyl ethane.

## DEPR:

Blends of 70 weight percent of a 2 cS polyalphaolefin with 15 weight percent soya oil triglycerides and 15 weight percent phenyl ortho xylyl ethane.

## DEPR:

According to the present invention, useful compositions may be derived by the combination of aromatic hydrocarbons with PAO's, polyol esters with PAO's, vegetable oils with PAO's, aromatics with polyol esters or vegetable oils, and combinations of aromatics, PAO's and either a polyol ester or a vegetable oil.

## CLPR:

18. The transformer of claim 6 wherein said coolant comprises a fluid made of two or more compounds selected from the group consisting of alphaolefin oligomers with carbon chain lengths of C.sub.6 to C.sub.12, aromatic hydrocarbons, polyols esterified to branched alkyl groups with chain lengths of C.sub.5 to C.sub.20, and triglycerides.

## CLPV:

wherein said liquid comprises a fluid made of two or more compounds selected from the group consisting of alphaolefin oligomers with carbon chain lengths of C.sub.6 to C.sub.12, aromatic hydrocarbons, polyols esterified to branched alkyl groups with chain lengths of C.sub.5 to C.sub.20, and triglycerides.

## CCOR:

336/55

## CCXR:

336/57

## CCXR:

336/58

## CCXR:

336/60

## CCXR:

336/61

## CCXR:

336/90

## CCXR:

336/94

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**Document Number 2**

Entry 2 of 40

File: USPT

Jan 13, 1998

US-PAT-NO: 5708558

DOCUMENT-IDENTIFIER: US 5708558 A

TITLE: Capacitor having dielectric material containing calcium oxide  
DATE-ISSUED: January 13, 1998**INVENTOR-INFORMATION:**

| NAME                | CITY   | STATE | ZIP CODE | COUNTRY |
|---------------------|--------|-------|----------|---------|
| Dequasie; Andrew E. | Pownal | VT    | N/A      | N/A     |

**ASSIGNEE INFORMATION:**

| NAME                                | CITY        | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|-------------------------------------|-------------|-------|----------|---------|-----------|
| Commonwealth Sprague Capacitor Inc. | North Adams | MA    | N/A      | N/A     | 02        |

APPL-NO: 8/ 650760

DATE FILED: May 20, 1996

INT-CL: [6] H01 G 4/32

US-CL-ISSUED: 361/301.5; 361/327, 361/301.3, 361/314, 361/319, 361/315, 252/575

US-CL-CURRENT: 361/327

FIELD-OF-SEARCH: 361/301.1, 361/301.3, 361/301.5, 361/305, 361/307, 361/308.1, 361/308.2, 361/309, 361/272, 361/311, 361/312, 361/313, 361/314, 361/315, 361/318, 361/319, 252/567

**REF-CITED:****U.S. PATENT DOCUMENTS**

| PAT-NO         | ISSUE-DATE    | PATENTEE-NAME | US-CL   |
|----------------|---------------|---------------|---------|
| <u>4317158</u> | February 1982 | Dequasie      | 361/272 |
| <u>4317159</u> | February 1982 | Dequasie      | 361/318 |

ART-UNIT: 213

PRIMARY-EXAMINER: Phillips; Michael W.

ASSISTANT-EXAMINER: Dinkins; Anthony

**ABSTRACT:**

A metalized film capacitor has a plurality of electrodes separated by dielectric spacers and contains a dielectric fill system including 1 to 50 wt % of calcium oxide scavenger. This dielectric fill system is especially useful in aluminum metalized film capacitors for AC service. 5 Claims, 2 Drawing figures

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Entry 5 of 40

File: USPT

Jan 24, 1995

US-PAT-NO: 5384684

DOCUMENT-IDENTIFIER: US 5384684 A

TITLE: Metallized plastic film capacitor

DATE-ISSUED: January 24, 1995

**INVENTOR-INFORMATION:**

| NAME              | CITY     | STATE | ZIP CODE | COUNTRY |
|-------------------|----------|-------|----------|---------|
| Sugisawa; Kunio   | Yokohama | N/A   | N/A      | JPX     |
| Hoshino; Hiroyuki | Kawasaki | N/A   | N/A      | JPX     |
| Hayashi; Shozo    | Yokohama | N/A   | N/A      | JPX     |

**ASSIGNEE INFORMATION:**

| NAME                                   | CITY  | STATE | ZIP CODE | COUNTRY | TYPE CODE |
|--|-------|-------|----------|---------|-----------|
| Nippon Petrochemicals Company, Limited | Tokyo | N/A   | N/A      | JPX     | 03        |

APPL-NO: 8/ 098309

DATE FILED: August 6, 1993

FOREIGN-APPL-PRIORITY-DATA:

FOREIGN-PRIORITY:

FOREIGN-PRIORITY-APPL-NO: JP 3-349857

FOREIGN-PRIORITY-APPL-DATE: December 10, 1991

**PCT-DATA:**

PCT-DATE-FILED: December 10, 1992

PCT-APPL-NO: PCT/JP92/01613

PCT-371-DATE: August 6, 1993

PCT-102(E)-DATE: August 6, 1993

PCT-PUB-NO: WO93/12529

PCT-PUB-DATE: June 24, 1993

INT-CL: [6] H01 G 4/08, H01 G 4/22, H01 B 3/48

US-CL-ISSUED: 361/323; 361/315, 252/567

US-CL-CURRENT: 361/315

FIELD-OF-SEARCH: 361/315, 361/327, 361/323, 585/6.3, 585/24-26, 252/567, 252/570, 174/17LF, 174/25C, 29/25.42

**REF-CITED:****U.S. PATENT DOCUMENTS**

| PAT-NO         | ISSUE-DATE   | PATENTEE-NAME   | US-CL   |
|----------------|--------------|-----------------|---------|
| <u>4591948</u> | May 1986     | Sato et al.     | 361/315 |
| <u>4639833</u> | January 1987 | Sato et al.     | 361/315 |
| <u>4929784</u> | May 1990     | Klinkman et al. | 585/422 |
| <u>4931900</u> | June 1990    | Lobo et al.     | 361/315 |
| <u>5107395</u> | April 1992   | Kawakami et al. | 361/315 |

## FOREIGN PATENT DOCUMENTS

| FOREIGN-PAT-NO | PUBN-DATE     | COUNTRY |
|----------------|---------------|---------|
| 55-5689        | February 1980 | JP      |
| 60-35408       | February 1985 | JP      |
| 61-51704       | March 1986    | JP      |

ART-UNIT: 216

PRIMARY-EXAMINER: Reynolds; Bruce A.

ASSISTANT-EXAMINER: Switzer; Michael D.

ATTY-AGENT-FIRM: Scully, Scott, Murphy &amp; Presser

## ABSTRACT:

An MF capacitor of an oil impregnation type, whose durability in constant voltage application is so high that it is suitable for practical use. The metallized plastic film is impregnated with an electrically insulating oil composition obtained by adding 5-80% by weight of natural fatty acid triglyceride which contains a less amount of fatty acid ester having free hydroxyl radical to an aromatic hydrocarbon having a specific chemical structure and being liquid at -30.degree. C.

6 Claims, 0 Drawing figures

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